

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-19 (Canceled)

20. (Currently Amended) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component ~~predominantly~~ parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$, and an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$, wherein the liquid crystal layer has an untwisted structure in its initial orientation and can be reoriented to a twisted structure by said field component oriented predominantly parallel to the liquid crystal layer.

Claims 21 - 26 (Canceled)

27. (Currently Amended) The electro-optical display device of claim 20, 37, ~~44, 63, 97,~~ 99, 101, 102, 103 or 119, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , α_0 , 1° .

Claims 28 - 29 (Canceled)

30. (Currently Amended) The electro-optical display device of claim 20, 37, ~~44, 63, 97,~~ 99, 101, 102, 103 or 119, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0$, 5° .

31. (Previously Presented) The electro-optical display device of claim 20, 37, ~~44, 63, 97,~~ 99, 101, 102, 103 or 119, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0$, 2° .

32. (Previously Presented) The electro-optical display device of claim 20, 37, ~~44, 63,~~ 97, 99, 101, 102, 103 or 119, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0$, 1° .

Claims 33 - 36 (Canceled)

37. (Previously Presented) An electro-optical display device of claim 20, wherein β_0 is not 45° .

Claims 38 – 40 (Canceled)

41. (Currently Amended) The electro-optical display device of claim ~~40, 44 or 119,~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the initial twist angle β of the liquid crystal molecules is within 15 degrees of 0° , or within 15 degrees of 90° .

Claims 42 - 46 (Canceled)

47. (Currently Amended) The electro-optical display device of claim ~~42~~ 20, 37, 97, 99, 101, 102, 103 or 119, further comprising an analyzer in optical relation with said polarizer.

48. (Currently Amended) The electro-optical display device of claim ~~20~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein $\Delta n \square d / \lambda$ of the liquid crystal layer is larger than zero but smaller than four.

49. (Currently Amended) The electro-optical display device of claim ~~40~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the axes of switching-effective twisting of the liquid crystal molecules are substantially perpendicular to the plane of the substrate.

Claims 50 - 57 (Canceled)

58. (Currently Amended) The electro-optical display device of claim ~~57~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein said matrix is an active matrix.

59. (Currently Amended) The electro-optical display device of claim-~~20~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the plurality of liquid crystal switching elements are addressed by the time multiplex method.

60. (Canceled)

61. (Currently Amended) The electro-optical display device of claim-~~58~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the active matrix is a transistor matrix.

Claims 62 - 69 (Canceled)

70. (Currently Amended) The electro-optical display device of claim-~~47~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the angle between the direction of the initial orientation of the liquid crystal molecules at the surface of the liquid crystal layer on the side of the polarizer and the light transmitting direction of the polarizer is approximately 90° , and the angle between the light transmitting direction of said polarizer and the light transmitting direction of the analyzer is approximately 0° or approximately 90° .

Claims 71 - 78 (Canceled)

79. (Currently Amended) The electro-optical display device of claim-~~20~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein the switching elements comprise a birefringent optical compensator in optical correlation with the liquid-crystal layer.

80. (Currently Amended) The electro-optical display device of claim-~~20~~ 20, 37, 97, 99, 101, 102, 103 or 119, wherein said liquid crystal layer comprises a polymer.

Claims 81 - 96 (Canceled)

97. (Previously Presented) An electro-optical device of claim 20, wherein said liquid crystal molecules have an orientation angle β_0 which is not 40° , not 45° and not 50° .

98. (Canceled)

99. (Previously Presented) An electro-optical device of claim 20, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 55^\circ$ or $\beta_0 < 35^\circ$.

100. (Canceled)

101. (Previously Presented) An electro-optical device of claim 20, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 65^\circ$ or $\beta_0 < 25^\circ$.

102. (Previously Presented) An electro-optical device of claim 20, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 70^\circ$ or $\beta_0 < 20^\circ$.

103. (Previously Presented) An electro-optical device of claim 20, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 75^\circ$ or $\beta_0 < 15^\circ$.

Claims 104 - 118 (Canceled)

119. (Currently Amended) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component ~~predominantly~~ parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$,

wherein said liquid crystal switching elements further comprise:

- (a) said liquid crystal molecules which are twistable;
- (b) a substrate;
- (c) an electrode structure which generates said electric field having a component predominantly parallel to the surface of said liquid crystal layer;
- (d) a polarizer in optical relation with said liquid crystal layer;

- (e) a voltage source or a current source connected to said electrode structure; and
- (f) an orientation layer, in contact with at least one surface of said liquid crystal layer, which aligns the liquid crystal molecules in a direction whereby they have an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$,

wherein the liquid crystal layer has an untwisted structure in its initial orientation and can be reoriented to a twisted structure by said field component oriented predominantly parallel to the liquid crystal layer.

Claims 120 – 124 (Canceled)

125. (New) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$, and an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$, wherein the initial twist angle β of the liquid crystal molecules is within 15 degrees of 0° , or within 15 degrees of 90° .

126. (New) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$,

wherein said liquid crystal switching elements further comprise:

- (a) said liquid crystal molecules which are twistable;
- (b) a substrate;
- (c) an electrode structure which generates said electric field having a component predominantly parallel to the surface of said liquid crystal layer;
- (d) a polarizer in optical relation with said liquid crystal layer;

(e) a voltage source or a current source connected to said electrode structure; and
(f) an orientation layer, in contact with at least one surface of said liquid crystal layer, which aligns the liquid crystal molecules in a direction whereby they have an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$,

wherein the initial twist angle β of the liquid crystal molecules is within 15 degrees of 0° , or within 15 degrees of 90° .

127. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 \leq 1^\circ$.

128. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 5^\circ$.

129. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 2^\circ$.

130. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 1^\circ$.

131. (New) An electro-optical display device of claim 125, wherein β_0 is not 45° .

132. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, further comprising an analyzer in optical relation with said polarizer.

133. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein $\Delta n \cdot d / \lambda$ of the liquid crystal layer is larger than zero but smaller than four.

134. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein the axes of switching-effective twisting of the liquid crystal molecules are substantially perpendicular to the plane of the substrate.

135. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said matrix is an active matrix.

136. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein the plurality of liquid crystal switching elements are addressed by the time multiplex method.

137. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein the active matrix is a transistor matrix.

138. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein the angle between the direction of the initial orientation of the liquid crystal molecules at the surface of the liquid crystal layer on the side of the polarizer and the light transmitting direction of the polarizer is approximately 90° , and the angle between the light transmitting direction of said polarizer and the light transmitting direction of the analyzer is approximately 0° or approximately 90° .

139. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein the switching elements comprise a birefringent optical compensator in optical correlation with the liquid-crystal layer.

140. (New) The electro-optical display device of claim 125, 126, 131, 141, 142, 143, 144 or 145, wherein said liquid crystal layer comprises a polymer.

141. (New) An electro-optical device of claim 125, wherein said liquid crystal molecules have an orientation angle β_0 which is not 40° , not 45° and not 50° .

142. (New) An electro-optical device of claim 125, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 55^\circ$ or $\beta_0 < 35^\circ$.

143. (New) An electro-optical device of claim 125, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 65^\circ$ or $\beta_0 < 25^\circ$.

144. (New) An electro-optical device of claim 125, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 70^\circ$ or $\beta_0 < 20^\circ$.

145. (New) An electro-optical device of claim 125, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 75^\circ$ or $\beta_0 < 15^\circ$.

146. (New) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$, and an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$,
wherein said liquid crystal molecules have an orientation angle $\beta_0 > 70^\circ$ or $\beta_0 < 20^\circ$.

147. (New) An electro-optical display device comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 < 30^\circ$,

wherein said liquid crystal switching elements further comprise:

- (a) said liquid crystal molecules which are twistable;
- (b) a substrate;
- (c) an electrode structure which generates said electric field having a component predominantly parallel to the surface of said liquid crystal layer;
- (d) a polarizer in optical relation with said liquid crystal layer;
- (e) a voltage source or a current source connected to said electrode structure; and
- (f) an orientation layer, in contact with at least one surface of said liquid crystal layer, which aligns the liquid crystal molecules in a direction whereby they have an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$,

wherein said liquid crystal molecules have an orientation angle $\beta_0 > 70^\circ$ or $\beta_0 < 20^\circ$.

148. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 \leq 1^\circ$.

149. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 5^\circ$.

150. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 2^\circ$.

151. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 \leq 1^\circ$.

152. (New) An electro-optical display device of claim 146, wherein β_0 is not 45° .

153. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein the initial twist angle β of the liquid crystal molecules is within 15 degrees of 0° , or within 15 degrees of 90° .

154. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, further comprising an analyzer in optical relation with said polarizer.

155. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein $\Delta n \cdot d / \lambda$ of the liquid crystal layer is larger than zero but smaller than four.

156. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein the axes of switching-effective twisting of the liquid crystal molecules are substantially perpendicular to the plane of the substrate.

157. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said matrix is an active matrix.

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158. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein the plurality of liquid crystal switching elements are addressed by the time multiplex method.

159. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein the active matrix is a transistor matrix.

160. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein the angle between the direction of the initial orientation of the liquid crystal molecules at the surface of the liquid crystal layer on the side of the polarizer and the light transmitting direction of the polarizer is approximately 90° , and the angle between the light transmitting direction of said polarizer and the light transmitting direction of the analyzer is approximately 0° or approximately 90° .

161. (New) The electro-optical display device of claim 20, wherein the switching elements comprise a birefringent optical compensator in optical correlation with the liquid-crystal layer.

162. (New) The electro-optical display device of claim 146, 147, 152, 163 or 164, wherein said liquid crystal layer comprises a polymer.

163. (New) An electro-optical device of claim 146, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 75^\circ$ or $\beta_0 < 15^\circ$.

164. (New) An electro-optical device of claim 147, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 75^\circ$ or $\beta_0 < 15^\circ$.

165. (New) An electro-optical display device comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules are in homogeneous alignment and have a pretilt angle α_0 and an orientation angle β_0 which prevent domain formation in said image and/or which impart to said image a small viewing angle dependence and a correspondingly improved image contrast, wherein said α_0 and β_0 values impart to said image a small viewing angle dependence wherein the variation of the degree of light transmission ($1-f_{\min}/f_{\max}$) is, over all ϕ values, below about 0.57 when θ is up to 45° .

166. (New) An electro-optical display device comprising a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules are in homogeneous alignment and have a pretilt angle α_0 and an orientation angle β_0 which reduce domain formation in said image and/or which impart to said image a small viewing angle dependence and a correspondingly improved image contrast, wherein said α_0 and β_0 values impart to said image a small viewing angle dependence wherein the variation of the degree of light transmission ($1-f_{\min}/f_{\max}$) is, over all ϕ values, below about 0.57 when θ is up to 45° .

167. (New) An electro-optical display device of claim 166 comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 < 30^\circ$ and an orientation angle β_0 , $0^\circ < \beta_0 < 90^\circ$.

168. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ \leq \alpha_0 \leq 1^\circ$.

169. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 5^\circ$.

170. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 2^\circ$.

171. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein said liquid crystal molecules have a pretilt angle α_0 , $0^\circ < \alpha_0 \leq 1^\circ$.

172. (New) An electro-optical display device of claim 167, wherein β_0 is not 45° .

173. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein the initial twist angle β of the liquid crystal molecules is within 15 degrees of 0° , or within 15 degrees of 90° .

174. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, further comprising an analyzer in optical relation with said polarizer.

175. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein $\Delta n \cdot d / \lambda$ of the liquid crystal layer is larger than zero but smaller than four.

176. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein the axes of switching-effective twisting of the liquid crystal molecules are substantially perpendicular to the plane of the substrate.

177. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein said matrix is an active matrix.

178. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein the plurality of liquid crystal switching elements are addressed by the time multiplex method.

179. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein the active matrix is a transistor matrix.

180. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, or 188, wherein the angle between the direction of the initial orientation of the liquid crystal molecules at the surface of the liquid crystal layer on the side of the polarizer and the light transmitting direction of the polarizer is approximately 90° , and the angle between the light transmitting direction of said polarizer and the light transmitting direction of the analyzer is approximately 0° or approximately 90° .

181. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein the switching elements comprise a birefringent optical compensator in optical correlation with the liquid-crystal layer.

182. (New) The electro-optical display device of claim 167, 172, 183, 184, 185, 186, 187, 188 or 189, wherein said liquid crystal layer comprises a polymer.

183. (New) An electro-optical device of claim 167, wherein said liquid crystal molecules have an orientation angle β_0 which is not 40° , not 45° and not 50° .

184. (New) An electro-optical device of claim 167, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 55^\circ$ or $\beta_0 < 35^\circ$.

185. (New) An electro-optical device of claim 167, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 65^\circ$ or $\beta_0 < 25^\circ$.

186. (New) An electro-optical device of claim 167, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 70^\circ$ or $\beta_0 < 20^\circ$.

187. (New) An electro-optical device of claim 167, wherein said liquid crystal molecules have an orientation angle $\beta_0 > 75^\circ$ or $\beta_0 < 15^\circ$.

188. (New) An electro-optical display device of claim 166 comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_0 , 0° , $\alpha_0 < 30^\circ$,

wherein said liquid crystal switching elements further comprise:

- (a) said liquid crystal molecules which are twistable;
- (b) a substrate;
- (c) an electrode structure which generates said electric field having a component predominantly parallel to the surface of said liquid crystal layer;
- (d) a polarizer in optical relation with said liquid crystal layer;

- (e) a voltage source or a current source connected to said electrode structure; and
- (f) an orientation layer, in contact with at least one surface of said liquid crystal layer, which aligns the liquid crystal molecules in a direction whereby they have an orientation angle β_O , $0^\circ < \beta_O < 90^\circ$.

189. (New) An electro-optical display device of claim 165 comprising a plurality of liquid crystal switching elements which comprise a liquid crystal layer comprising liquid crystal molecules and having a surface for display of an image which is switched under control of an electric field having a predominant component parallel to said surface, wherein said liquid crystal molecules have a pretilt angle α_O , $0^\circ \leq \alpha_O < 30^\circ$, and an orientation angle β_O , $0^\circ < \beta_O < 90^\circ$.